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DEATHRATE AMONG INSURED CANADIANS SOMEWHAT HIGHER THAN IN THE UNITED STATES

The deathrate among Canadian wage-earners and their dependents runs about 9 per cent. higher than for the industrial wage-earning population in the United States. This is entirely due to the high deathrates in the provinces of Quebec, New Brunswick and Nova Scotia—more especially Quebec. These statements are based on an analysis of the mortality statistics of approximately one and one-quarter million Canadian Industrial policyholders of the Metropolitan Life Insurance Company, for the years 1925 to 1930.

There are nevertheless many encouraging features in the Canadian health situation. The tendency of the mortality rate for most of the preventable diseases has been definitely downward; and in 1930 typhoid fever, scarlet fever, diphtheria, influenza, tuberculosis of the respiratory system, and puerperal conditions recorded lower mortality among Canadian policyholders than ever before. On the other hand, the improvement in Canada for diphtheria and tuberculosis has by no means matched that among American policyholders. For diphtheria, it was not until 1930 that a marked change for the better was observed. For tuberculosis (all forms), the decline in Canada has been small in recent years. There is much to be accomplished, especially in Quebec, in connection with these diseases.

With respect to most of the other important diseases, the course of the deathrate among insured Canadians has not differed materially from that observed for policyholders in the United States. The mortality from cancer has shown the same persistent rise in each country; diabetes mortality increased rather sharply during the first three years of the six-year period, 1925-1930, and remained fairly stationary for the last three. In each country there has been a tendency toward slightly lower mortality from chronic nephritis.

The deathrate for organic heart disease has not increased, whereas in the United States there has been an appreciable rise.

The table below presents the deathrates among Canadian Industrial policyholders, for each year of the period 1925 to 1930.

The most favorable feature in the Canadian mortality statistics, as compared with those for the United States, is that relating to deaths from violent causes. Suicides show a much lower deathrate than among American wage-earners, although the mortality from this cause rose quite sharply in each country in 1930. Fatal acci-

Metropolitan Life Insurance Company
Deathrates per 100,000 for Principal Causes. Weekly Premium-Paying Business in Industrial Department. Canadian Head Office. 1925-1930 (All Ages)

Cause of Death	1930	1929	1928	1927	1926	1925
All Causes of Death	871.1	917.6	883.9	905.2	912.8	869.3
Typhoid fever	4.1	4.6	6.0	26.9	5.7	6.3
Communicable diseases of childhood	40.1	48.9	42.9	60.7	56.8	47.4
Measles	6.8	8.4	5.8	11.7	10.7	7.3
Scarlet fever	6.6	7.3	6.7	9.2	7.1	8.6
Whooping cough	13.5	11.3	8.9	17.0	22.1	11.9
Diphtheria	13.2	21.9	21.5	22.8	16.9	19.6
Influenza and Pneumonia	112.6	159.4	121.6	107.9	145.0	112.1
Influenza	21.5	57.4	33.5	25.0	49.0	27.0
Pneumonia	91.1	102.0	88.1	82.9	96.0	85.1
Tuberculosis—All forms	97.3	96.8	94.3	100.9	102.5	104.1
Tuberculosis of resp'y system	72.1	77.2	76.0	84.4	81.8	85.8
Cancer—All forms	65.9	63.6	60.2	61.9	57.2	58.0
Diabetes mellitus	10.0	9.2	11.3	10.3	9.0	6.9
Cerebral hemorrhage, apoplexy	39.8*	35.3	32.3	32.1	30.8	32.5
Diseases of heart	79.8	84.4	79.2	82.8	84.6	76.0
Diarrhea and enteritis	83.7	79.5	96.2	93.3	98.5	110.8
Chronic nephritis (Bright's Disease)	34.9	37.7	35.8	36.3	39.2	31.6
Puerperal state—Total	14.8	15.3	16.2	18.6	18.4	20.6
Total external causes	55.1	56.2	57.3	56.9	47.8	47.4
Suicides	4.2	3.1	2.8	2.8	2.8	2.9
Homicides	.8	.2	.8	.6	.4	.6
Accidents—Total	50.1	52.9	53.7	53.5	44.6	43.9
Accidental burns	3.5	4.5	6.3	4.9	4.8	5.2
Accidental drowning	9.8	11.6	9.9	10.7	8.7	8.8
Accidental traum. by fall	3.2	4.7	4.9	3.9	4.7	3.9
Accidental traum. by machines	.8	1.3	1.0	1.0	.4	.8
Railroad accidents	1.5	3.0	2.9	2.4	3.0	1.7
Automobile accidents	11.9	13.2	10.7	10.6	8.5	7.5
All other accidents	19.4	14.6	18.0	20.0	14.5	16.0
Other diseases and conditions	233.0	226.7	230.6	216.6	217.3	215.6

*Not comparable with rates for prior years.

dents also exact a lower toll of life among Canadian wage-earners than obtains in the United States. The deathrates for definite types of accidents, like burns, drownings, falls, machinery accidents, railroad accidents, and more especially automobile fatalities, run, year after year, well below the figures for this country. Canada, nevertheless, has been experiencing a rising automobile accident deathrate, which almost doubled between 1925 and 1929. In 1930, however, a decided reduction was observed.

The greatest contrast between the mortality statistics of the United States and Canada is found in the figures for homicides. Murders and manslaughters are relatively rare occurrences in Canada. During six years, only 39 homicidal deaths were recorded among Canadian wage-earners insured in the Metropolitan. The deathrate ran from a low point of 0.2 per hundred thousand insured lives to a maximum of 0.8. During the same time, in the United States, the rate ran from a minimum of 7.0 to a maximum of 7.7, and 7,368 deaths were charged to this cause. Obviously, the very high homicide rate in the United States among approximately two and one-quarter millions of insured negroes accounts for some of the difference; but even if the comparison is made on the basis of white lives, the homicide deathrate in Canada stands at approximately one-sixth that in the United States. Possibly one explanation for Canada's low homicide deathrate is the more prompt and more certain disposition in that country of the cases of those who give way to the homicidal impulse.

IS THE DEATHRATE FROM STOMACH AND DUODENAL ULCERS INCREASING?

In 1930, the highest deathrate on record for ulcers of the stomach and duodenum was experienced among male Industrial policyholders of the Metropolitan Life Insurance Company. This high point was reached after a gradual, definite rise year after year since 1921. The mortality among females, at all ages combined, seems to have been decreasing since 1921.

If we compare average deathrates for the three years, 1927 to 1930, with those for 1921 to 1923, we find an increase in peptic ulcer mortality of 38.5 per cent. for white males and of 22.7 per cent. for colored males. For the same two periods, there was a *decline* of 8.3 per cent. for white females and of 6.8 per cent. for colored females.

Among white males, the increases are pronounced at each of the age periods beyond age 20, when deaths from this disease become numerically significant. Beyond age 45, where the deathrate from ulcers of the stomach and duodenum ranges currently between 20 and 30 deaths per 100,000 per annum, the deathrate for the years 1927 to 1930 was from 42 to 77 per cent. higher than in the earlier period 1921 to 1923. Among colored males, the increases in the deathrate are somewhat irregular in adult and later life, because of the smaller number of lives exposed to risk, but there is strong intimation that there has been among these males also an increasing deathrate. For white females, decreases in the deathrate are general at all age periods, except between 45 and 54 years of age, where a 9.6 per cent. increase was recorded. Colored females showed decreased mortality when all ages combined are considered, but this favorable record is limited largely to the younger ages, below 35. Between 35 and 64 years for colored females, there were increases in the deathrate.

This is the first time that mortality data in this detail have been assembled and published for this disease in the United States. It is not possible to state clearly what have been the factors leading to the apparent increases in the deathrate. At the present time it is possible only to suggest further inquiry into the facts of case-incidence, into results of medical and surgical treatment for living cases, and into the changes which may have arisen in diagnostic precision. The medical literature of recent years shows that numerous angles of the peptic ulcer problem are being attacked productively. The relative merits of medical and surgical treatment, the end results of such treatment, diagnostic procedures, and, lately, the etiology of the disease have been discussed on the basis of qualified research.

It is hoped that the following table will be of interest to the many inquirers who have been trying to understand mortality from the disease in its general aspects. For the whole period 1921 to 1930, the age progression and the relative color and sex incidence of fatalities may be determined. It is not generally known that the recorded peptic ulcer mortality for colored persons exceeds that of the white race in this country and that the mortality of white males is nearly three times that of white females. Among males, there may be noted the early age at which the deathrate reaches high figures and the sharp gradient of the deathrate up to age 45, as contrasted with the low and more slowly rising rate for females.

Deathrates per 100,000 from Ulcers of the Stomach and Duodenum by Color, Sex and Age Divisions. Metropolitan Life Insurance Company, Industrial Department, 1921 to 1930

Age Period	Deathrate, Period 1921 to 1930				Per Cent. Increase (+) or Decrease (—) 1927 to 1930 Since 1921 to 1923			
	White		Colored		White		Colored	
	Males	Females	Males	Females	Males	Females	Males	Females
Ages—1 to 74	6.3	2.3	8.5	5.5	+38.5	— 8.3	+ 22.7	— 6.8
15 to 19	.8	.5	1.1	1.3	—30.0	—50.0	— 40.0	—61.5
20 to 24	2.5	1.0	4.4	3.2	+13.6	—23.1	+ 13.2	—50.9
25 to 34	6.7	1.8	6.3	3.5	+29.1	—28.6	+174.2	—37.0
35 to 44	16.0	3.1	11.6	6.7	+14.9	—23.7	+ 17.3	+ 7.4
45 to 54	23.9	5.7	21.0	11.6	+51.3	+ 9.6	+ 4.0	+23.8
55 to 64	25.5	8.2	28.9	17.1	+76.5	— 4.9	— 10.5	+ 1.9
65 to 74	27.3	11.9	22.8	22.2	+41.6	— 5.0	+146.8	— 9.2

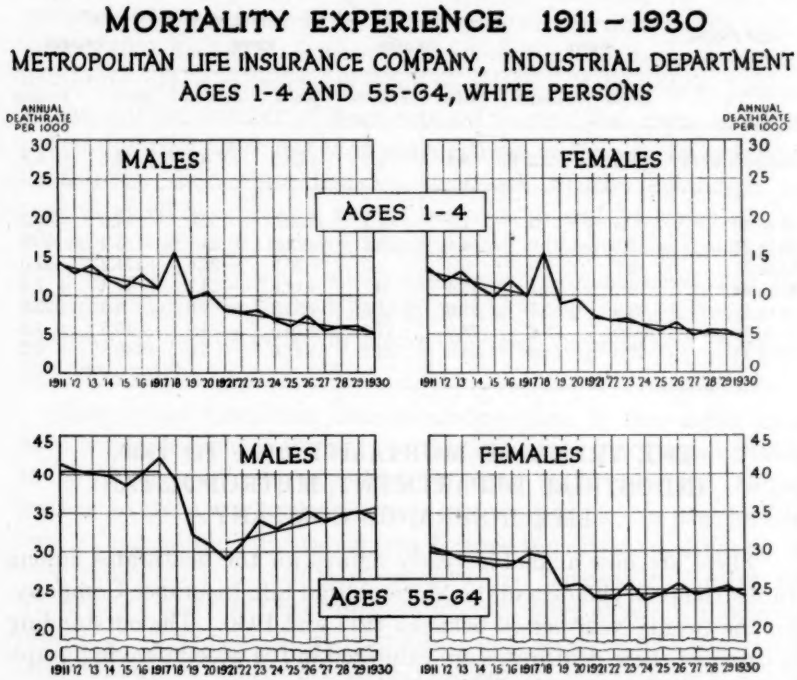
THE TREND OF MORTALITY, 1911 TO 1930, INDUSTRIAL DEPARTMENT, METROPOLITAN LIFE INSURANCE COMPANY

There are now available yearly figures for the deathrates among Industrial policyholders of the Metropolitan Life Insurance Company, for the twenty-year period between 1911 and 1930. The outstanding features of these deathrates are exhibited in the accompanying graph and table. Of these, the following is a brief summary.

In the higher age groups, especially among males, the course of the deathrate is rather clearly built up of two separate parts. From 1911 to 1917, there was not very much change in the deathrates at these ages, and a line drawn among the observed points is not far from horizontal. The year 1918 is notable for the severe influenza pandemic which occurred, and this was followed by more or less marked recrudescences in the immediately succeeding years. Following upon this disturbed period, we seem to start on a different era, beginning with a much lower level of the deathrates, in the higher age groups, in the year 1921, followed by a rather definitely marked rise back toward the old level. This level, however, has not, to date, actually been reached. These remarks apply in a general way to white males in the age groups 35 to 44, 45 to 54, 55 to 64 and 65 to 74, becoming more accentuated as we proceed to the higher age groups. In the

diagram, only one of these age groups is exhibited as an example, namely, the group 55 to 64 years.

A somewhat different situation is observed at the other extreme of life, that is, in the lowest age group, ages one to four. Here the



Mean Annual Deathrate per 1,000 at Specified Age Periods, 1911 to 1930. All Causes of Death. Fall or Rise in Deathrate per 1,000 per Year, with Standard Error. White Males and White Females. Metropolitan Life Insurance Company—Industrial Department.

trends from the year 1911 to 1917 and from 1921 to 1930 do not differ very greatly. The second period has a somewhat less rapid rate of fall than the first period; but the difference between the two is slight.

In intermediate age groups the difference between the trend in the first period, 1911 to 1917, and the second, 1921 to 1930, is even less; in fact, in the age group five to nine, the trend is practically continuous.

In the higher age groups, especially among males, the marked change in level and slope between the trend in the period 1911 to 1917 and that in the period 1921 to 1930, is a rather remarkable fact, for which one naturally seeks an explanation. Some writers have said that the influenza epidemic purged the population of some of the more susceptible individuals, so that the surviving population, by selection, was more robust than the general population before the outbreak. This, if true, would account for the marked lowering of level of the

Mean Annual Deathrate per 1,000 at Specified Age Periods, 1911 to 1930. All Causes of Death. Fall or Rise in Deathrate per 1,000 per Year, with Standard Error. White Males and White Females. Metropolitan Life Insurance Company—Industrial Department.

Color; Sex; Age	1911 to 1930*				1911 to 1917				1921 to 1930			
	Death-rate per 1,000	Mean Fall (—) or Rise (+) Per Year (b) with Standard Error (σ_b)†		b/σ_b	Death-rate per 1,000	Mean Fall (—) or Rise (+) Per Year (b) with Standard Error (σ_b)†		b/σ_b	Death-rate per 1,000	Mean Fall (—) or Rise (+) Per Year (b) with Standard Error (σ_b)†		b/σ_b
		b	$\pm\sigma_b$			b	$\pm\sigma_b$			b	$\pm\sigma_b$	
White Males												
All ages—1 and over	9.5	—.28	±.029	10	11.9	—.13	±.059	2	8.1	—.02	±.025	1
1 to 4	9.0	**—.48**	±.028	17	12.5	**—.47**	**±.164**	3	6.7	**—.33**	±.062	5
5 to 9	3.0	**—.10**	±.008	13	3.6	—.09	±.041	2	2.5	**—.10**	±.017	6
10 to 14	2.1	**—.04**	±.006	7	2.3	—.01	±.022	1	1.9	**—.07**	±.008	9
15 to 19	3.4	**—.08**	±.015	5	3.9	+.04	±.057	1	2.9	**—.06**	±.010	6
20 to 24	4.8	**—.19**	±.033	6	6.1	—.01	±.109	‡	3.8	**—.08**	±.011	7
25 to 34	6.8	**—.34**	±.040	9	9.4	**—.16**	±.081	2	5.0	**—.06**	±.026	2
35 to 44	11.5	**—.51**	±.056	9	15.9	**—.25**	±.103	2	9.0	—.02	±.044	‡
45 to 54	19.2	**—.47**	±.091	5	23.8	+.04	±.212	‡	16.8	**+.24**	±.093	3
55 to 64	35.6	**—.42**	±.122	3	40.4	+.01	±.242	‡	33.4	**+.50**	±.143	4
65 to 74	72.8	**—.77**	±.182	4	80.6	+.17	±.603	‡	68.8	+.43	±.308	1
White Females												
All ages—1 and over	8.8	—.21	±.015	14	10.4	—.16	±.076	2	7.7	—.03	±.024	3
1 to 4	8.1	**—.46**	±.032	14	11.5	**—.50**	**±.195**	3	5.9	**—.27**	±.055	5
5 to 9	2.6	**—.11**	±.007	16	3.3	**—.12**	±.047	3	2.1	**—.09**	±.014	6
10 to 14	1.8	**—.06**	±.005	12	2.2	—.03	±.018	2	1.6	**—.08**	±.011	7
15 to 19	3.1	**—.08**	±.012	7	3.6	+.01	±.030	‡	2.7	**—.10**	±.006	17
20 to 24	4.6	**—.13**	±.022	6	5.3	**—.13**	±.051	3	3.9	**—.13**	±.013	10
25 to 34	5.6	**—.19**	±.030	6	6.7	**—.19**	±.032	6	4.5	**—.12**	±.014	9
35 to 44	7.5	**—.22**	±.015	15	9.2	**—.24**	±.050	5	6.4	**—.11**	±.024	5
45 to 54	12.6	**—.23**	±.023	10	14.4	—.13	±.098	1	11.4	—.03	±.031	1
55 to 64	26.3	**—.33**	±.050	7	29.2	**—.23**	±.141	2	24.6	+.06	±.089	1
65 to 74	60.9	**—.78**	±.102	8	67.3	+.03	±.426	‡	57.1	—.37	±.271	1

*In computing slope constants, year 1918 omitted for series 1911 to 1930. †Figures in bold face are "significant," *i.e.*, the slope constant is two or more times the standard error. ‡Less than 0.5.

trend line after, as compared with that before the influenza pandemic; and it would also explain the fact that, since 1921, the deathrate has been rising again, as if it were intent upon reaching the old level. This explanation is hardly satisfactory, however, for the very age groups in which this change of level is most marked are the ones that suffered relatively little from the influenza pandemic. This struck hardest the age group from 20 to 40 years, whereas the sudden drop in level of the trend line is most marked at ages 55 and over.

We are here confronted with a phenomenon for which an entirely satisfactory explanation has not been forthcoming. Possibly, in order to gain a proper understanding of the situation, we may have to study not only mortality rates, but also morbidity rates. The relation between these two may be different in different age groups.

HEALTH RECORD FOR MAY, 1931

Health conditions in May, 1931, were better than have ever been observed during the month of May in any previous year. This is indicated by the remarkably low deathrate of 8.4 per 1,000, among the millions of Industrial policyholders of the Metropolitan Life Insurance Company. The nearest approach to the above figure is 8.8, as recorded in the same month of both 1921 and 1930.

Since the influenza outbreak of last winter, health conditions have shown such marked improvement that the year-to-date deathrate at the end of May was only 1.8 per cent. in excess of the lowest figure for the like part of any previous year. Among Canadian policyholders and those in the Pacific Coast and Mountain States, the cumulative deathrate has been lower this year than ever before registered for the January-May period. In Canada, the decline, as compared with 1930, is 8.4 per cent.

Diphtheria and tuberculosis continue to be the most noteworthy items on the favorable side of the year's health record. The cumulative deathrate for the former (4.9 per 100,000) marks a decline of more than 37 per cent. from the figure for the corresponding five months period in 1930; and a drop of 52 per cent. since 1929. The drop for tuberculosis, in a single year, has been 5.4 per cent. and in two years, 14.8 per cent. It is now almost a certainty that the year 1931 will register a new low point in the deathrate from tuberculous disease. As for diphtheria, it would require an outbreak, such as has not occurred in many years, to preclude the attainment of a new low deathrate this year. Puerperal conditions, also, are causing fewer

deaths than ever before. Lower cumulative mortality rates, as compared with the like part of 1930, are in evidence for whooping cough, diarrheal diseases and accidents.

One decidedly disturbing item in the mortality statistics of this year is an unusually large rise in the cancer deathrate. While the general trend of the mortality from cancer has been upward for many years, there has been little change from year to year. Thus far, in 1931, however, the rate has increased more than 8 per cent., as compared with the corresponding period of 1930. Every month has shown a considerably higher cancer deathrate than that for the corresponding month of last year. Other causes of death to register higher mortality rates than in the like part of 1930 are measles and scarlet fever (both by small margins); influenza (by 64 per cent.); diabetes (by 13 per cent.); pneumonia, suicides and homicides (all by small margins).

The cumulative deathrate for automobile fatalities (18.3 per 100,000) exceeds only slightly the 1930 figure for the like period (18.0). The May mortality rate for this cause was well below that registered for May, 1930.

The deathrate in the general population of the large cities, in May, was 11.9 per 1,000 estimated population, as compared with 12.9 in April and 12.7 in May, 1930. Comparison with the facts for April show increased prevalence of measles, poliomyelitis and typhoid fever, with fewer cases of diphtheria, influenza, scarlet fever and smallpox. As compared with May, 1930, there was more sickness from influenza, measles and scarlet fever, but lower morbidity from diphtheria, poliomyelitis, smallpox and typhoid fever. These statements are based on cases reported during the first four weeks of April and May, 1931, and of May, 1930.

With respect to the various reportable diseases, the most noteworthy data relate to influenza and smallpox. For the former, only 3,933 cases were reported in May, as compared with 11,491 in April. The decline was general throughout the country and was particularly marked in the South. Reports from forty-seven states show smallpox cases to have declined from 4,067, in April, to 3,423 in May.

Among the more noteworthy public health activities of the month were the following. A bill creating a Child Welfare Commission passed the Connecticut Legislature and was approved by the Governor. In Kansas, the Legislature established a commission with power to approve hospitals, convalescent homes and boarding houses

for crippled children and to organize and conduct diagnostic clinics. The CONFERENCE OF STATE AND TERRITORIAL HEALTH OFFICERS, at Washington, D. C., adopted a plan for establishing morbidity reporting areas. Chicago has recently established two tumor clinics for the study and treatment of malignant diseases. A hospital for defective delinquents is to be built under Federal auspices. The five County medical societies in New York City have launched a five-year campaign to promote health examinations. A study of the morbidity of heart disease is being conducted in New York State by about 1,000 up-state physicians under the auspices of the Division of Vital Statistics of the State Department of Health.

Facilities for the study and treatment of cancer have been augmented by a cancer control center recently established by the American Oncological Hospital, in cooperation with the University of Pennsylvania Graduate School of Medicine. The object is to investigate the causes of cancer, develop measures for preventing it, improve methods of treatment, and furnish radium emanations to physicians or institutions requiring them.

The following table shows the mortality among Industrial policyholders for May, 1931; April, 1931, and May, 1930, together with the cumulative rate for the first five months of each year.

METROPOLITAN LIFE INSURANCE COMPANY

Deathrates* per 100,000 for Principal Causes, Premium-Paying Business in Industrial Department (Annual Basis)

MONTHS OF MAY, 1931; APRIL, 1931, AND OF MAY, 1930

CAUSES OF DEATH	RATE PER 100,000 LIVES EXPOSED*				
	May 1931	Apr. 1931	May 1930	Cumulative January to May	
				1931	1930
TOTAL—ALL CAUSES	841.8	975.1	884.5	971.1	953.5
Typhoid fever	1.6	.9	1.2	1.2	1.2
Measles	5.9	5.9	6.1	4.6	4.5
Scarlet fever	3.9	4.2	2.6	4.0	3.6
Whooping cough	3.4	2.8	4.5	3.7	4.7
Diphtheria	4.2	3.0	5.8	4.9	7.8
Influenza	16.9	33.0	14.1	38.5	23.5
Tuberculosis (All forms)	79.5	80.5	85.9	81.7	86.4
Tuberculosis of resp'y system	70.0	70.0	74.7	72.5	75.1
Cancer	77.4	82.8	74.2	82.6	76.4
Diabetes mellitus	18.9	22.9	18.6	23.0	20.4
Cerebral hemorrhage	60.4	68.8	60.5	66.5	63.8
Organic diseases of heart	145.3	168.4	145.8	166.2	161.9
Pneumonia (All forms)	71.8	111.0	90.6	114.8	111.8
Other respiratory diseases	10.2	13.3	12.2	13.1	13.2
Diarrhea and enteritis	8.8	9.4	11.5	9.9	11.7
Bright's Disease (Chronic nephritis)	64.4	73.7	68.6	72.5	72.4
Puerperal state	10.4	13.3	11.6	11.8	12.8
Suicides	9.5	11.2	10.2	9.6	9.5
Homicides	7.3	6.0	6.0	6.6	6.5
Other external causes (excluding suicides and homicides)	51.8	53.4	57.2	52.5	56.7
Traumatism by automobiles	18.1	18.5	19.3	18.3	18.0
All other causes	190.2	210.7	197.1	203.4	204.7

*All figures in this table include insured infants under one year of age. The rates for 1931 are subject to slight correction, since they are based on provisional estimates of lives exposed to risk.

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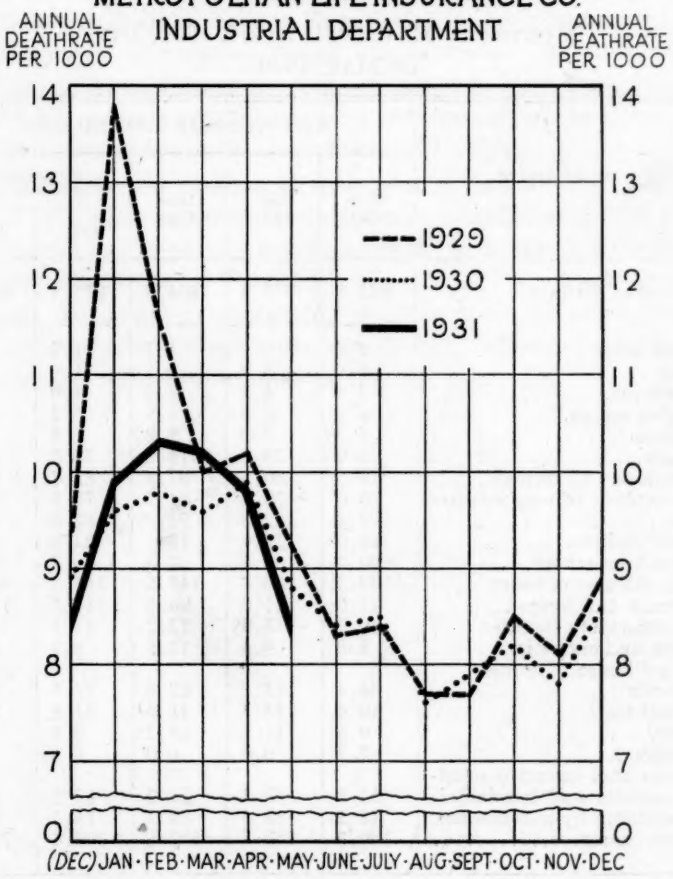
DEATHRATES
FROM ALL CAUSES

METROPOLITAN LIFE INSURANCE CO.
INDUSTRIAL DEPARTMENT



1929	13.8	11.6	10.0	10.2	9.2	8.3	8.4	7.7	7.7	8.5	8.1	8.9
1930	9.6	9.8	9.6	9.9	8.8	8.4	8.5	7.6	7.9	8.2	7.8	8.6
1931*	9.9	10.3	10.2	9.8	8.4							

*Rates for 1931 are provisional

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